PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Cooling Apparatus for Beer and Other Beverages

We, J. SAMUEL WHITE & COMPANY LIMITED, a Company registered under the Laws of Great Britain, of Medina Road, West Cowes, Isle of Wight, Hampshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to cooling apparatus for beer, cider and other beverages (hereinafter for convenience called beer) of the kind stored in metal kegs and dispensed from such kegs.

Such metal kegs as at present used have a base of recessed form either by being formed wholly concave or by being provided with a downwardly extending rim with the whole of the part of the base which is surrounded by that rim (and is usually then covex) lying above the plane of the lower edge of the rim, while an opening by which they are filled and through which the beer is subsequently withdrawn is provided at the other end and normally closed by a screw plug or the equivalent during transport and storage. Such other end may, and usually will, be otherwise of the same general recessed form as the base.. Moreover the recessed end or each recessed end of the keg is usually provided with a series of six to twelve radial strengthening ribs of wedge-shaped cross-section in planes containing the axis of the keg evenly angularly spaced about this axis and each extending from the rim, where it is of the same depth as the rim, towards the centre of the base and terminating at the "thin end" of the "wedge", at a point between (say about half way between) the rim and the centre of the base, such kegs will for convenience herein be referred to as standard metal kegs.

Apparatus for cooling beer stored in standard metal kegs according to the present invention comprises refrigerating apparatus in which the evaporator is in the form of a metallic platform containing the evaporator passage or passages and having an upper surface portion which has a protuberant form and dimensions corresponding to the recessed form and dimensions of the base of a standard metal keg in such manner that the base of a keg placed thereon will make the surface to surface contact therewith over substantially the whole of the area of such base. Where the apparatus is intended for use with standard metal kegs having radial ribs on the base as described above, the upper surface of the platform will also be provided with correspondingly formed radial grooves to receive the ribs in question, for example 12 radial grooves, so as to be suitable for use with kegs having 6 to 12 radial ribs.

In some cases the platform in question may have only a single surface portion having the required form and dimensions corresponding to the form and dimensions of the base of a standard metal keg, while in other cases the metallic platform may be provided with two or more such surface portions so as to be capable of supporting two or more standard metal kegs in the manner referred to. Alternatively the apparatus may comprise two or more separate evaporation platforms each formed in the manner described and together constituting the evaporator system.

In any case there is preferably also included in the apparatus a discharge pipe formed and arranged for insertion through the aperture in the upper end of a standard metal keg resting upon the platform and so that when so inserted it will extend to a point adjacent to the base of the keg and beer withdrawn therethrough will thus flow over the adjacent part of the surface of the base of the keg before entering the discharge pipe. The beer entering the discharge pipe will thus tend to be adequately

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conform to the convexity of the outer surface of the centre part of the base 19 of the keg and is provided with eight radially extending grooves 23a to receive the eight wedge-shaped ribs on the base of the keg, if provided, all so that substantially the whole of the under surface of the centre part of the base 19 of the keg will make contact with the corresponding part of the upper surface of the casting 23. The casting 23 is provided with a flange 26 which bears, through a rubber gasket 27 on the upper surface of a hollow supporting member 28 filled with glass wool or other heat-insulating material, and having an aperture 29 in its upper surface to receive the lower portion of the casting 23 as shown all for the purpose of reducing the transfer of heat from the atmosphere to the under side of the pad 11. Pipes 30 and 31 communicating respectively with the ends of the coil 25 pass through the member 28.

In the modified form of pad shown in Figure 4 the construction is generally similar to that shown in Figure 3, and similar parts have been given similar reference numerals, but the casting 23, instead of being provided with a flange 26, is formed to provide a trough 32 around its central area into which open the outer ends of the grooves 23a in the concave upper surface of the central part of the casting 23 so that this trough receives any water which may drain along such grooves from the centre portion of the casting. In the construction shown in Figure 4 moreover, instead of the hollow supporting member 28 there is provided a body of glass wool or the like 33 retained in place beneath the pad by means of a plate 34 and enclosed in a sheet metal housing 35 having an opening 36 in its upper wall to receive the rim 22 of a keg placed upon the pad. In addition the pad as a whole is conveniently mounted on a plywood panel 37 to reduce conduction of heat to the sides of the metal housing, and a sponge rubber or similar gasket 38 is disposed between the top edge of the trough 32 and the top of the housing 35 to prevent the entry of moisture into the glass wool or like insulation 33. A drain pipe 39 is provided for the flow of water from the trough 32 into a drip tray 40 situated below the plate 34.

In the refrigeration system shown diagrammatically in Figure 5, which may be regarded as embodying a cooling pad as described above with reference to Figure 3 or 4 and as being incorporated in apparatus as described with reference to Figure 1 and Figure 2 the system comprises a compressor 41 arranged to be driven, e.g. by an electric motor and to pump refrigerant vapour through a heat exchanger 42 cooled by a motor-driven fan 43, from which exchanger liquid passes through a restrictor 44 via the pipe 31 into the copper evaporator coil 25 of the cooling pad and then back from the coil through the pipe 30 to the suction side of the compressor 41, all in conventional manner.

The temperature of the pad 11 incorporating the evaporator coil 25 is controlled by means of an adjustable thermostat 45 the temperature sensing part of which is disposed in a cavity provided in the wall of the casting 23 of the pad as indicated at 46. A mechanically-operated time switch may also be incorporated to short-circuit the thermostat 45 for a predetermined period, say between 30 minutes and 45 minutes, so that, when the time switch is put into operation the refrigerating system will operate at maximum output for the predetermined period to provide the "initial pull-down" required to reduce the temperature at the bottom of a keg placed on the pad comparatively rapidly from normal atmospheric temperature to that desired for consumption.

For example, the apparatus may be arranged to reduce the temperature of beer at the base of the keg from about 70°F. to about 59°F. in the 30-minute time interval, after which the time switch will cut out and put the thermostat 45 into circuit so that the thermostat will thereafter maintain the contents of the keg at a temperature of, say, 10°F. to 15°F. below the ambient temperature thereafter.

Whereas beer cooling apparatus as above described having a single cooling pad will be satisfactory for use where the demand for and consumption of cool beer is comparatively intermittent, where a steadier demand and consumption over a substantial period is anticipated, cooling apparatus having two cooling pads as illustrated in Figure 6 may be preferable. In the refrigeration circuit shown in Figure 6 corresponding parts to those in Figures 1 to 5 are indicated by the same reference numerals. Also included in the circuit of Figure 6 is a liquid receiver 42*a* between the heat exchanger 42 and the coil 25 while the restrictor 44 is replaced by a thermostatic expansion valve 44*a*. As will be seen, in this arrangement the evaporator coil 25 of a cooling pad 11 is connected in series with the evaporator coil 25 of a second similar cooling pad 11A, the latter being hereinafter for convenience referred to as the holding pad, the arrangement being such that the refrigerant liquid supplied to the evaporator coil 25 of the cooling pad 11 passes from the outlet pipe 30 of that pad to the inlet pipe 31 of the pad 11A. Situated in the pipe connecting the two coils 25 of the pads 11 and 11A is a phial 47 connected to the thermostatic expansion valve 44*a*.

In operation the coil 25 of the pad 11 is flooded with liquid until the liquid reaches the phial 47, which then operates to close valve 44*a* shutting off the supply of refrigerant to the coil 25 of the pad 11 so that the liquid then in the coil 25 of the pad 11 boils off. The phial thus operates to prevent as far as possible liquid from passing into the coil 25 of

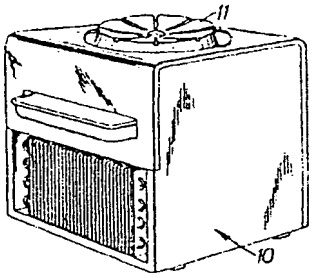

FIG. 1.

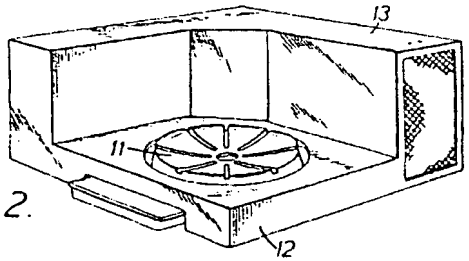

FIG. 2.

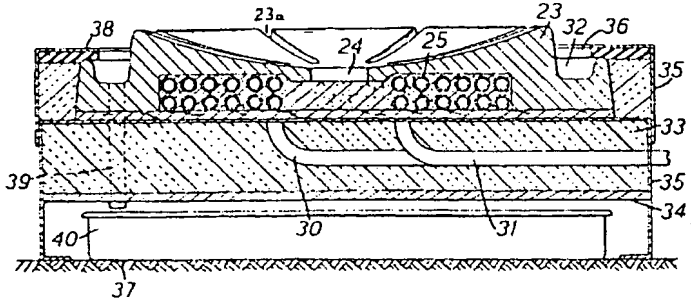

FIG. 4.

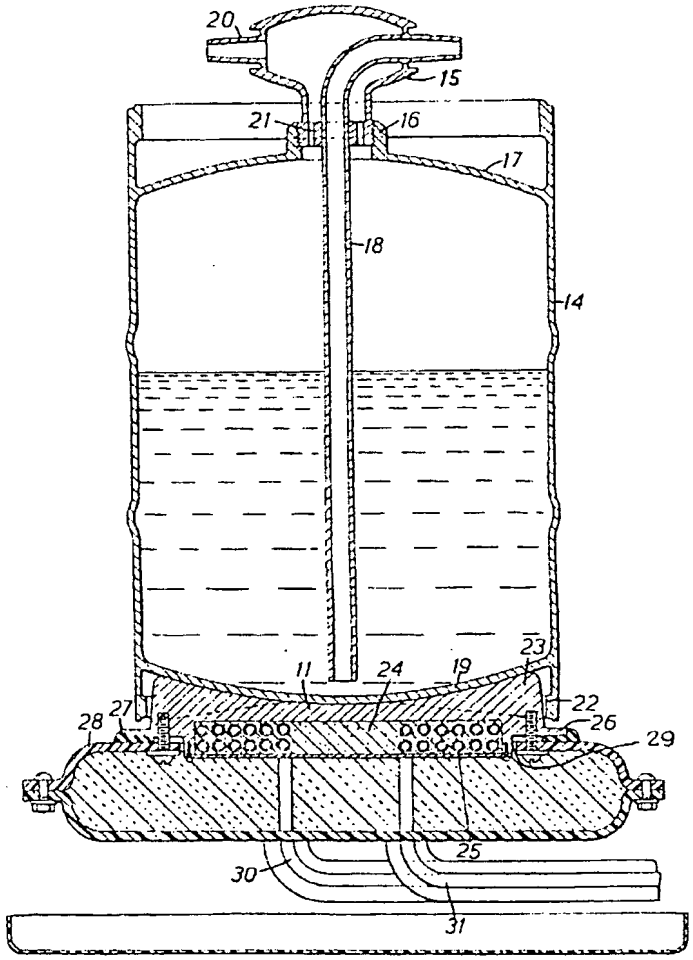

FIG. 3.